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## Variable Oak Leaf Caterpillar

By Louis F. Wilson<sup>1</sup>

The variable oak leaf caterpillar (*Heterocampa manteo* (Dblly.)) is a common insect in deciduous forests in eastern North America. It has been recorded from nearly all States and Canadian Provinces east of a line drawn from western Ontario through eastern Texas. Heavy defoliation may occur anywhere, but the insect is generally more abundant in the southern part of its range. Some infestations have covered several million acres and extended hundreds of miles.

### Hosts

Larvae of this insect feed on the foliage of a large number of deciduous trees. All species of oaks are susceptible to defoliation, with white oak generally preferred. Infestations are commonly recorded on southern red, northern red, pin, willow, black, laurel, bur, and post oaks. Exotic oaks, beech, basswood, paper birch, and American elm are frequently attacked also. Occasional hosts are walnut, black birch, hawthorn, eastern hophornbeam, apple, boxelder, and persimmon. This insect has been reported also on pinckneya or fever-bark, a very rare tree that grows only along the coastal plain of South Carolina, Georgia, and Florida.

### Injury

Trees of all sizes are susceptible to attack by this insect. Since the greatest amount of feeding usually occurs in August or later, trees of sapling size or larger can withstand

2 or 3 consecutive years of extreme defoliation before extensive injury occurs. Infestations very rarely last longer than this. Heavy defoliation, however, reduces tree vigor and growth. In the South, where infestations are normally more severe than in the North, occasionally some trees are killed.

While recorded outbreaks have been short, it is possible that under a peculiar set of environmental conditions a prolonged epidemic could occur. Therefore, careful evaluation of any outbreak should be made.

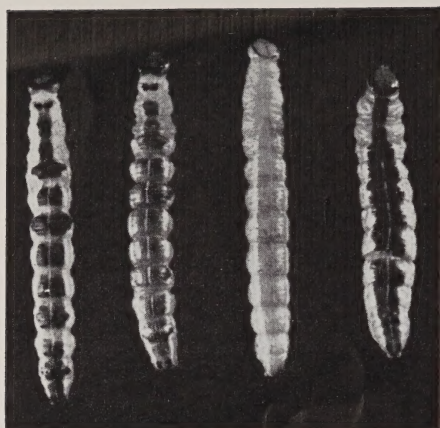
### Description

The newly oviposited egg is pale white, glossy, and very finely sculptured with irregular hexagonal markings. It is hemispherical and about 0.8 mm. in diameter.

The fully grown larva (fig. 1) is about 1½ inches long and sparsely covered with short hairs. The head varies in color from amber brown to yellow to green. Two lateral, curved bands, the outer a creamy white and the inner reddish brown to black, adorn each side of the head. The general body color is yellowish green. A white or pale-green longitudinal band runs along the dorsal midline. Lateral to this band is a reddish-brown coloration bordered by a creamy yellow stripe. One or sometimes two longitudinal yellow stripes run below this. The reddish-brown coloration is highly variable and irregular in shape and size. It may

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FIGURE 1.—Fully grown larvae of the variable oak leaf caterpillar showing some of the variability in markings (actual size).

cover a great deal of the body or be absent, with all degrees in between.

The pupa is about  $\frac{1}{2}$  inch long, moderately stocky, dark reddish brown and shiny, with two small spines at the posterior tip.

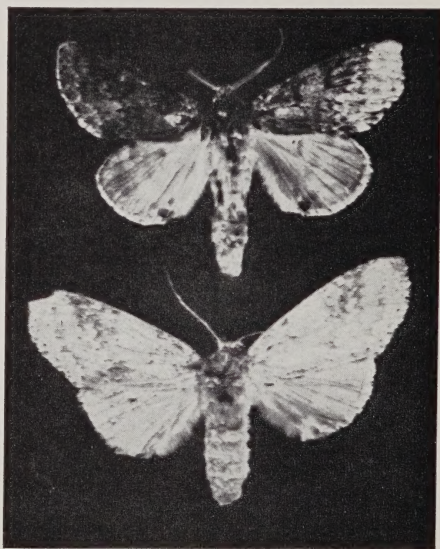
The moth has a wing expanse of  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches. Each forewing may be light or dark ashy gray with three darker lines, wavy and diffused, and generally one inconspicuous black spot (fig. 2). The hindwings are light brown with a very faint white line on each.

### Life History and Habits

One generation per year is normal in the northern part of the variable oak leaf caterpillar's range. In the southern part, beginning about at a line extending from Virginia to Missouri, two generations are common. The insects overwinter as prepupae in cocoons in the leaf litter or topsoil, and normally pupate the following spring, although some have been known to remain in the soil for a year or more before pupating.

In the North the moths begin to emerge near the end of May or early June and lay their eggs singly on leaves of the host. Each female may lay as many as 500 eggs, which hatch in 7 to 10 days. The young larvae skeletonize the lower surface of the leaves at first, but as they become older they consume all the foliage between the major veins (fig. 3). About mid-August they cease feeding, move to the ground, and spin their cocoons.

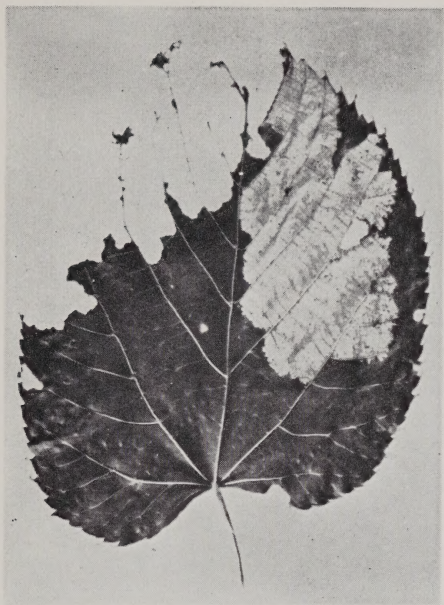
In the South the moths begin to emerge about mid-April or early May. Eggs can be observed by the end of April. Larvae, hatched from them in May, feed until late June or early July and then pupate in the soil. Adults appear by late July and lay eggs. Second-generation larvae begin feeding by mid-August. Upon completion of feeding in late September or early October, they move to the ground and spin their cocoons. This generation overwinters as prepupae and pupates in April of the following year.



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FIGURE 2.—Adult moths of the variable oak leaf caterpillar. Male above, female below (actual size).





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FIGURE 3. — Basswood leaf showing characteristic skeletonizing (right) by the very young larvae of the variable oak leaf caterpillar and free feeding (left) by the older larvae ( $\times \frac{1}{2}$ ).

Development varies from year to year, depending on local weather conditions or the latitude of the infestation. In one instance, numerous larvae were observed feeding in January in Arkansas.

### Associated Insects

Although the variable oak leaf caterpillars by themselves can cause severe defoliation, they are frequently found feeding with one or more other species of related Lepidoptera. The combined feeding activity defoliates a stand more severely. The most commonly associated species are the red-humped oakworms (*Symmerista albicosta* (Hbn.) and *S. albifrons* (A. & S.)), the orange-striped oakworm (*Anisota senatoria* (J. E. Smith)), the yellow-necked caterpillar (*Datana ministra* (Drury)), the walnut caterpillar (*Datana integerrima* G. & R.), and the saddled prominent (*Heterocampa guttivitta*

(Wlk.)). Since they all belong to the same family as the variable oak leaf caterpillar (Notodontidae), their life histories and habits are similar. However, the variable oak leaf caterpillar can be distinguished easily from the others and is usually more abundant.

### Natural Control

Eggs of parasitic flies (Tachinidae) occasionally are found attached to larvae, and the wasplike parasite *Ophion bilineatus* Say (Ichneumonidae) has been reared from larvae. Several species of insects of the families Tachinidae, Ichneumonidae, and Braconidae have been reared from the closely related saddled prominent and probably attack the variable oak leaf caterpillar as well.

The large predatory ground beetles, *Calosoma scrutator* (F.) and *C. calidum* (F.), have been found in trees with the variable oak leaf caterpillar in their mandibles. Other predators, particularly rodents, have been known to eat the prepupae in the ground.

Sometimes in the spring a very large infestation may completely collapse even when many prepupae have hibernated in the soil. Whether their failure to emerge is due to climatic, biotic, or other causes has not been determined. Parasites and predators are not known to be effective in controlling these rapidly rising insect populations.

### Direct Control

Since past records have shown that most outbreaks, although spectacular, subside before much injury occurs, chemical control over large areas is generally neither necessary nor recommended. Control may be necessary for the occasional prolonged outbreak that results in some tree mortality.

For very small areas or for ornamental trees, control can be ob-

tained by using a formulation containing 6 level tablespoons of DDT (25-percent emulsion concentrate) in 5 gallons of water. This should be applied to the foliage with a hydraulic or knapsack sprayer about 2 or 3 weeks after emergence of the larvae. In the South, two applications may be necessary, one for each generation.

Fuel oil solutions should not be used, as heavy dosages may injure foliage or cambium of the small twigs.

**Caution:** DDT is poisonous. Store it in plainly labeled containers away from all food. Follow directions and heed precautions given by the manufacturer.

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